THE ALL INDIA VILLAGE INDUSTRIES ASSOCIATION

TABLE
OF

INDIAN FOOD VALUES

AND

VITAMINS

KUM

MAGANVADI
WARDHA
1951

(58)

THE ALL INDIA VILLAGE INDUSTRIES ASSOCIATION

76

TABLE OF INDIAN FOOD VALUES AND VITAMINS

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MODEL CENTRE FOR VILLAGE INDUSTRIES
T. KALLUPATTY
Madurai Dt.

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613.2 KUM

MAGANVADI
WARDHA
1951

First Edition 1941

Second Edition 1943

Reprinted 1946

Second Reprint 1951

This book is printed on hand-made paper

Price Re. 0-8-0

Published by—J. C. KUMARAPPA
The All-India Village Industries Association,
Maganvadi, Wardha, M. P.

Printed by—G. B. JOSHI
at the Bhaskar printing Press, Wardha, M. P.

9-'51-2000]

PREFACE TO THE SECOND EDITION

That a new edition of the Tables of Indian Food Values and Vitamins should have been required within less than two years from the date of the original publication indicates the widespread interest that the programme of the All-India Village Industries Association for the improvement of the diet of the people has aroused. The strenuous times through which India, with the rest of the world, is passing, emphasise the necessity of economizing the food resources of the nation and of insisting on discrimination in consumption. A perusal of this booklet will, it is hoped, facilitate this task, for the social worker as well as the individual consumer.

Brief sections have been added on some indigenous invalid foods (for which the A. I. V. I. A. is indebted to Dr. A. Lakshmi Pathi) and on the preparation and use of malts.

The table and material relating to the composition of 'Well Balanced Diet' on page 1 have been slightly revised as a result of experience and investigation. For helping in this revision, the grateful thanks of the A. I. V. I. A. are due to Dr. M. J. Trivedi of Wardha.

VAIKUNTH L. MEHTA
Member,
Board of Management

Bombay, 10th December, 1942.

NUTRITIVE VALUE OF INDIAN ARTICLES OF FOOD

The table of food values is taken from Health Bulletin No. 23 of the Government of India, but rearranged as seemed most suited to our requirements.

1. Calories are heat units by which food requirements are estimated. The following is a practical scale of calorie requirments.

				Calories required
Adult male (over 14)	...	...	...	2,600
Adull female (over 14)	...	...	...	2,100
Child 12 and 13 years	...	...	...	2,100
Child 10 and 11 years	...	...	...	1,800
Child 8 and 9 years	...	...	...	1,600
Child 6 and 7 years	...	...	...	1,300
Chilb 4 and 5 years	...	...	...	1,000

2. The composition of a 'well balanced' diet may be roughly indicated as follows:—

					* *Calories obtained*
Protein	...	...	2.28	ozs	260
Fat	...	...	1.76	,,	4.60
Carbohydrates	...	...	16.37	,,	1.900
Calcium	...	...	0.038	,,	,,
Phosphorus	...	...	0.052	,,	,,
Iron	...	...	44.00	units	,,
Vitamin A			over 7,000	,,	,,
Vitamin B			over 400	,,	,,
Vitamin C			about 170.0	,,	,,
					2,610

Proteins

For our climate, it is a good rul e to consume a smaller amount of proteins, and from this point of view 65 gms. of proteins are taken as standard for the balanced diet. Vegetarian diet, especially

* One gramme of protein or carbohydrate gives 4.1 calories and one gramme of fat gives 9 calories.

the cereals, which form the staple food of Indians and which contain proportionately less protein and more carbohydrates, has thus a scientific basis for its adoption.

As certain important and essential amino-acids found in animal proteins are not present in vegetable proteins, animal proteins are necessary for body building. Their proportion should be at least 1/5. To get this ideal of 1/5 animal proteins in the above 2.28 ozs of protein requirements, 0.45 ozs of milk proteins are necessary. According to the tables given in the book this can be had from nearly 14 ozs. of cow's milk, or nearly 10½ ozs. of buffalo's milk. If, in the present economic condition of India, whole milk is too costly, the same quantity of skimmed milk, which contains the same protein value as the whole milk, may be substituted. Butter milk, also, is as good a substitute as skimmed milk, its protein value depending on the degree of its dilution.

Vegetable proteins are contained in a fair proportion in the cereals. The outer layers of the grain are richer in protein than the inner starchy kernel, and when wheat and rice are milled there is a large loss of protein as well as of other valuable factors, such as vitamins and mineral salts.

Fat

About 1.76 ozs of fat (animal fat included) should be taken daily on an average. If the diet is low in animal fat, it is important to utilize the sun's rays (ultra violet) and to take leafy vegetables and carrots.

If the above quantity of whole milk is taken 0.5 ozs of fat will be provided from cow's milk and 0.93 ozs. of fat from buffalo's milk. This leaves a balance of about 1.24 ozs. of fat in the case of cow's milk and about 0.845 ozs. of fat in the case of buffalo's milk, which can be supplemented from vegetable fat. In this dietary, ghee, butter or cream is not necessary.

Incidentally, it may be noted that Indian cow's ghee usually contains from 1,000 to 2,500 units of vitamin A per 100 gms (=3.5 ozs) and buffalo's ghee appears to have in general a lower vitamin content.

As the science of dietetics is still growing and as every day some new information is added in the research of vitamins, for the layman it is important to develop a healthy habit of keeping variety in every day meals. Variety in diet, is necessary not only to make food appetising but also to keep it 'well balanced.'

3. An illustration of a 'well balanced' diet :—

AG551

Article			*Weight*
Rice	...	...	10 ozs.
Millet	...	...	5 „
Milk	...	...	8 „
Pulses	...	...	3 „
Non-leafy vegetables		...	6 „
Green leafy vegetables		...	4 „
Fats and oils	...	...	2 „
Fruits	...	...	2 „

4. 'Extra' requirements of women during the later months of pregnancy and lactation may be very roughly indicated as follows:–

Food factor				*Percentage of increase in requirements*
Calories	...	...	...	25
Protein	...	...	...	50
Fat	...	...	...	10
Calcium	...	...	...	100
Phosphorus		...	...	50
Iron	...	...	...	50

Requirements of the various vitamins are also raised.

5. We have thought it well to give also the biological value of protein content of foods, as what is of practical value is not so much, how much protiens a grain contains, as how much of this is assimilable by us, which is what biological value means.

6, 100 grammes = 3.5 ounces = 8,75 tolas.
1 ounce = 28.4 grammes
1 tola = 11.4 grammes,
1 seer: 2 lbs. = 907.2 grammes,

7. As no International unit has yet been established for Vitamin B_2 the method of indicating values by the following signs has been adopted: + + + = very rich source, + + = a good source, + = the presence of vitamin but not in large amounts.

Absence of figures means that determinations have not yet been carried out.

8. In the following tables, 100 grammes of the food stuff is the basis of expression. The units of measurement for iron and vitamins are different. The names of these units are not given here as they are likely to cause much confusion to the reader who has no acquaintence with the metric system.

9. Carotene is otherwise called pro-vitamin A as our body is capable of converting it into Vitamin A.

CEREALS

No.	Name of Foodstuff	Hindi Name	Protein Content %	Biological value of Protein Content %	Fat %	Mineral Matter %	Carbohydrates%
1	Wheat, whole	Gehun	11.8	7.70	1.5	1.5	71.2
2	Whole wheat Flour	Atta	12,1	8,1	1,7	1.8	72.2
3	Wheat flour refined	Maida	11.0	7.37	.9	0.4	74.1
4	Bajra (cambu)	Bajra	11.6	9.60	5,0	2,7	67,1
5	Juar (cholam)	Juar	10.4	8.63	1,9	1,8	74,0
6	Barley	Jau	11.5	8,16	1.3	1.5	69.3
7	Italian millet	Kangani	12.3	9.47	4.7	3,2	60,6
8	Kootu	Kootu	10.3	...	2.4	2,4	65.0
9	Maize	Makai bhutte	4,3	2.58	0.5	0.7	15.1
10	Maize dry	Makai	11.1	6.66	3,6	1,5	66.2
11	Maize flour	Makai atta	0,6	...	0.5	0.4	87
12	Oat-meal	Jai	13.6	8,84	7.6	1.8	62.8
13	Pani-varagu	Chaina	12.5	...	1.1	3.4	68.9
14	Varagu	Kodom or Kodra	8.3	...	1,4	2.9	65.6
15	Ragi	Mandal or Okra	7.1	6,31	1.3	2,2	76.3
16	Samai	Kutki	7.7	...	4.7	4.8	63.7
17	Sanwa-millet	Sawan	6.2	...	2.2	4.4	65.5
18	* Talipot (treated)	Tad Phal ka Atta	1,3	...	0.1	1.9	89,4
19	Vermicelli	Siwain	8.7	...	0.4	0.5	78.7
20	Sago	Sabudana	0.2	...	0.2	0.3	87,1
†21	Rice, raw, home pounded	Hathkuta chawal	8.5	6,80	0.6	0.7	78
22	Rice, parboiled home pounded	Usana hathkuta chawal	8.5	6.60	0.6	0.9	77,4
†23	Rice, raw milled	Mill kuta chawal	6.9	5,52	0.4	0.5	79.2
24	Rice, parboiled milled	Usna mill kuta chawal	6,4	5.12	0.4	0.8	79.1
25	Rice flakes	Poha	6,6	5,28	1,2	1.8	78,2
26	Rice, puffed	Murmura	7.5	6	0.1	3.4	74.3
27	† Rice, raw, unmilled (Prepared in wooden grinder)	Bagad	7,2	...	2,3	1.3	75.1

* Soaked with four times its weight of water, allowed to settle over night, supernatent liquid discarded and residue sundried.

† Prepared from the same sample of paddy.

CEREALS

Moisture %	Calcium %	Phosphorus %	Iron units %	Calories per 100 gms.	Carotene Units per 100 gms.	Vitamin B1* Units per 100 gms,	Vitamin B2	Vitamin C, units per 100 gms.	No.
12,8	0.05	0.32	5.3	346	108	180	...	...	1
12.2	0.04	0.32	7.3	353	...	...	...	...	2
13,3	0 02	0.09	1.0	349	...	40	...	...	3
12,4	0.05	0.35	8.8	360	220	110	Poor	...	4
11.9	0.03	0,28	6.2	355	136	115	Poor	...	5
12,5	0.03	0.23	3.7	335	...	150	Poor	...	6
11.2	0.03	0.29	6,3	334	54	195	...	...	7
11.3	0.07	0.30	13,2	323	...	300	...	...	8
79,4	0.01	0.10	0.7	82	42	...	...	4	9
14.9	0.01	0.33	2,1	342	...	...	...	...	10
11.5	0,02	0.32	5.3	355	...	...	...	...	11
10.7	0.05	0.38	3,8	374	Trace	325	...	...	12
11,9	0,01	0.33	5,7	336	Trace	...	...	...	13
12.8	0.04	0,24	5.2	338	Trace	110	...	...	14
13,1	0.33	0,27	5.4	345	70	140	Poor	17	15
11.5	0,02	0.36	7,1	328	Trace	100	...	...	16
11,9	0.02	0.28	2,9	307	Trace	...	...	...	17
7,3	0.09	0.04	22.2	364	...	...	...	...	18
11,7	0,02	0.08	0.3	358	Trace	...	...	...	19
...	0.02	0.01	1,3	353	...	...	...	...	20
12,2	0.01	0.17	2,8	351	4	60	Poor	...	21
12.6	0.01	0.28	2.8	349	15	90	...	...	22
13.0	0.01	0.11	1,0	348	0	20	Poor	...	23
13,3	0,01	0.15	2.2	346	0	70	Poor	...	24
12,2	0,02	0.22	8	350	...	70	Poor	...	25
14.7	0,02	0.16	6.2	328	...	70	Poor	...	26
14,1	0.01	0.23	4.5	350	...	95	...	7	27

* All whole grain foods are rich in Vitamin B_1 while milled grains are largely deprived of this vitamin. An exception is parboiled milled rice which retains some Vitamin B_1 after milling,

PULSES

No.	Name of Foodstuff	Hindi Name	Protein Content %	Biological value of Protein Content %	Fat %	Mineral Matter %	Carbohydrates%
1	Bengal gram (with outer husk)	Chana	17.1	13	5.3	7.2	61.2
2	Bengal gram roasted (without outer husk)	Bhuna Chana	22.5	17.10	5.2	2.2	58.9
3	Black gram (without outer husk)	Urd	24.0	15.36	1.4	3.4	60.3
4	Bhatmas	Bhatwans	41.3	...	17.0	4.5	24.1
5	Cow gram	Lobia bada	24.6	...	.7	3.2	55.7
6	Green gram (with outer husk)	Mung	24.0	12.24	1.3	3.6	56.6
7	Red gram (without outer husk)	Arhar	22.3	16.54	1.7	3.6	57.2
8	Horse gram	Kulthi	22.0	12.98	0.5	3.1	57.3
9	Field bean dry	Val	24.9	18.00	0.8	3.2	60.1
10	Lentil	Masur	25.1	10.290	0.7	2.1	59.7
11	Peas, dried	Bada matar	19.7	...	1.1	2.1	56.6
12	Peas, roasted	Bhuna matar	22.9	...	1.4	2.3	63.5
13	Soya beans	Soya bean	43.2	23.32	19.5	4.6	20.9

* Sprouted pulses contain 10 to 15 units

LEAFY VEGETBALES

No.	Name of Foodstuff	Hindi Name	Protein Content %	Biological value of Protein Content %	Fat %	Mineral Matter %	Carbohydrates%
14	Agathi	Agasthi	8.4	...	1.4	3.1	11.8
15	Amarnth, tender	Lal Cholai	4.9	3.60	0.5	3.1	5.7
16	,, spind	Kantewali choalai	3.0	...	0.3	3.6	8.1
17	Bamboo, tender shoots	Bans	3.9	...	0.1	1.4	7.5
18	Bengal gram leaves	Sagchana	7.0	...	1.4	2.1	11.7
19	Cabbage	Band gobhi	1.8	1.4	0.1	0.6	6.3
20	Carrot leaves	Sag gajar	5.1	...	.5	2.8	8.3
21	Celery	Ajwanka patta	6.0	...	.6	2.1	8.6
22	Coriander	Dhania	3.3	...	0.6	1.7	6.5
23	Curry leaves	Gandhela	6.1	...	1.0	4.2	16.0
24	Drum stick	Saijan	6.7	2.75	1.7	2.3	13.4
25	Fenugreek	Methi	4.9	...	0.9	1.6	9.8

PULSES

Moisture %	Calcium %	Phosphorus %	Iron units	Calories per 100 gms	Carotene Units per 100 gms.	Vitamin B 1 Units per 100 gms,	Vitamin B 2	Vitamin * C units per 100 gms.	No.
9.8	0.19	.24	9.8	361	316	100	...	...	1
11.2	0.07	.31	8.9	372	...	...	...	...	2
10.9	0.20	.37	9.8	350	64	140	++	...	3
...	0.21	.60	9.9	415	...	...	...	...	4
12.0	0.07	.49	3.8	327	...	60	++	...	5
10.4	0.14	.28	8.4	334	158	155	++	...	6
15.2	0.14	.26	8.8	333	220	150	++	...	7
11.8	0.28	.39	7.6	322	119	...	...	...	8
9.6	0.06	.45	2.0	347	Trace	...	None	...	9
12.4	0.13	.25	2.0	346	450	150	+	...	10
16.0	.07	.30	4.4	315	...	150	...	...	11
9.9	0.03	.36	5.0	358	...	...	...	...	12
8.1	0.24	.69	11.5	432	710	300	++	...	13

of Vitamin C per 100 gms.

LEAFY VEGETABLES

73.1	1.13	0.08	3.9	93	9,000	...	...	...	14
85.8	0.50	0.10	21.4	47	2,500 to 11,000	10	+	173	15
85.0	0.80	0.05	22.9	47	...	...	...	...	16
87.1	0.02	0.09	0.1	47	Trace	...	...	...	17
77.8	0.34	0.12	23.8	87	...	...	...	...	18
90.2	0.03	0.05	0.8	33	2000	50	...	124	19
83.3	0.34	0.11	8.8	58.0	...	...	...	...	20
81.3	0.23	0.14	6.3	64.0	5,800 to 7,500	Trace	...	62	21
87.9	0.14	00.6	10.0	45.0	10,460 to 12,600	...	++	135	22
66.3	0.81	0.06	3.1	97.0	12,600	...	++	4	23
75.0	0.44	0.07	7.0	96.0	11,300	70	...	220	24
81.8	0.47	0 05	16.9	67	3,900	70	...	...	25

LEAFY VEGETABLES—(*Contd.*)

No.	Name of Foodstuff	Hindi Name	Protein Content %	Biological value of Protein Content %	Fat %	Mineral Matter %	Carbohydrates%
1	Khesari leaves	Kesari sag	6.1	...	1.0	1.1	7.6
2	Lettuce	Salad	2.1	...	.3	1.2	3 0
3	Mint	Pudina	4.8	...	.6	1.6	.8
4	Nim, tender	Nim, patti	11.6	...	3.0	2.6	21.2
5	Parsley	...	5.9	...	1.0	3.2	19.7
6	Rape seed leaves	Sarso sag	5.1	...	.4	2.5	7.1
7	Safflower leaves	Sag kardi	3.3	...	.7	1.0	5.1
8	Spinach	Palak	1.9	...	.9	1.5	4.0

ROOTS AND TUBERS

No.	Name of Foodstuff	Hindi Name	Protein Content %	Biological value of Protein Content %	Fat %	Mineral Matter %	Carbohydrates%
9	Beet root	Chukander	1.7	...	.1	.8	13.6
10	Carrot	Gajar	0.9	...	.1	1.1	10.7
11	Onion	Pyaj	1.8	...	.1	.6	13.2
12	Parsnip	...	1.3	...	.3	1.1	23.2
13	Potato	Alu	1.6	...	.1	.6	22.9
14	Sweet potato	Sakarkand	1.2	...	.3	1.0	31.
15	Radish (pink)	Muli lal	.6	...	.3	.9	7.4
16	„ (white)	Muli safed	.7	...	.1	.6	4.2
17	Tapioca	Maravali or Simla alu	.7	...	.2	1.0	38.7
18	Yam (elephant)	Jaminkand	1.2	...	.1	.8	18.4
19	Yam (ordinary)	Ratalu	1.4	...	.1	1.6	27.0

OTHER VEGETABLES

No.	Name of Foodstuff	Hindi Name	Protein Content %	Biological value of Protein Content %	Fat %	Mineral Matter %	Carbohydrates%
20	Ash gourd	Petha	.4	...	.1	.3	3.2
21	Bitter gourd	Karela	1.6	.2	.2	.8	4.2
22	„ (small)	„	2.9	...	.1	1.4	9.8
23	Brinjal	Baingan	1.3	...	.3	.5	6.4
24	Calabash Cucumbar	Lowaki	.2	...	.1	.5	2.9
25	Cauliflower	Fulgobi	3.5	...	.4	1.4	5.3
26	Cluster beans	Guar ki phali	3.7	...	.2	1.4	9.9
27	Cucumber	Kakri	.4	...	.1	.3	2.8
28	Drumstick	Saijan	2.5	...	.1	2.0	3.7
29	French beans	Bakla	1.7	...	.1	.5	4.5
30	Jack, tender	Kataal	2.6	...	.3	.9	9.4
31	Kandal kat hiri	Kateli	3.1	...	.8	1 6	4.8

LEAFY VEGETABLES—(*Contd.*)

Moisture %	Calcium %	Phosphorus%	Iron units	Calories per 100 gms	Carotene Units per 100 gms.	Vitamin B 1 Units per 100 gms,	Vitamin B 2	Vitamin C, units per 100 gms.	No.
84.2	0.16	0.10	7.3	64	6.000	...	...	...	1
92.9	.05	.03	2.4	23	2,200	90	...	15	2
83.0	.20	.08	15.6	57	2,700	...	...	...	3
59.4	.13	.19	25.3	158	4,600	...	...	...	4
68.4	.39	.19	17.9	111	3,200	...	...	281	5
84.9	.37	.11	12.5	52	...	...	...	...	6
89.9	.18	.06	7.6	40	5,500	...	...	...	7
91.7	.06	.01	5.0	32	2,600 to 3,500	70	...	48	8

ROOTS AND TUBERS

Moisture %	Calcium %	Phosphorus%	Iron units	Calories per 100 gms	Carotene Units per 100 gms.	Vitamin B 1 Units per 100 gms,	Vitamin B 2	Vitamin C, units per 100 gms.	No.
83.8	.20	.06	1.0	62	Trace	70	...	88	9
86.0	.08	.03	1.5	47	2000to 4,300	60	...	3	10
84.3	.04	.06	1.2	61	25	40	...	11	11
72.4	.05	.04	.4	101	30	105	...	16	12
74.7	.01	.03	.7	99	40	20	++	17	13
66.5	.02	.05	.8	132	10	...	++	24	14
90.8	.05	.02	.5	35	3	60	...	17	15
94.4	.05	.03	.4	21	3	60	...	15	16
59.4	.05	.04	.9	159	...	15	...	...	17
78.7	.05	.02	.6	79	434	20	...	Trace	18
69.9	.06	.02	1.3	115	...	24	...	Trace	19

OTHER VEGETABLES

Moisture %	Calcium %	Phosphorus%	Iron units	Calories per 100 gms	Carotene Units per 100 gms.	Vitamin B 1 Units per 100 gms,	Vitamin B 2	Vitamin C, units per 100 gms.	No.
96.0	.03	.02	.5	15	Trace	21	...	1	20
92.4	.02	0.07	2.2	25	210	24	Poor	88	21
83.2	.05	.14	9.4	60	210	24	...	88	22
91.5	.02	.06	1.3	34	5	15	+	23	23
96.3	.02	.01	.7	13	Trace	...	...	...	24
89.4	.03	.06	1.3	39	38	110	...	66	25
82.5	.13	.05	5.8	56	330	...	...	49	26
96.4	.01	.03	1.5	14	Trace	30	...	7	27
86.9	.03	.11	5.3	26	184	...	...	120	28
91.4	.05	.03	1.7	26	221	26	...	14	29
84.0	.03	.04	1.7	51	...	...	...	...	30
75.5	.10	.09	1.2	39	...	...	...	...	31

OTHER VEGETABLES—(*Contd.*)

No.	Name of Foodstuff	Hindi Name	Protein Content %	Biological value of Protein Content %	Fat %	Mineral Matter %	Carbohydrates%
1	Kovai fruit tender	Kundru	1.2	...	.1	.5	3.5
2	Knol khol	Khol rabi	1.1	...	.2	.7	5.9
3	Ladies fingers	Bhendi	2.2	...	.2	.7	7.7
4	Leeks	Vilayathi lasson	1.8	...	.1	.7	17.2
5	Mango green	Kairi, Am	0.05	...	.1	.4	8.8
6	Amla	Amla	0.5	...	.1	.7	14.1
7	Parwar	Parwar	2.0	...	.3	.5	1.9
8	Peas (English)	Matar	7.2	...	.1	.8	19.8
9	Pink beans	Papri	2.4	...	.2	.6	6.2
10	Plantain flower	Kela ka ful	1.5	...	.2	1.2	5.0
11	Plantain green	Kela kachha	1.4	...	.2	.5	14.7
12	Pumpkin	Kaddu	1.4	...	.1	.6	5.3
13	Ridge gourd	Torai	.5	...	.1	.3	3.7
14	Singara (water chest-nut)	Singara	4.7	...	.3	1.1	23.9
15	Snake gourd	Chachida	.5	...	.3	.7	4.4
16	Tomato green	(टमाटर)	1.9	...	.1	.7	4.5
17	Turnip	Salgam	.5	...	.2	.6	7.6
18	Vegetable marrow	Safed kaddu	.5	...	.1	0.3	4.3

NUTS AND OILSEEDS

No.	Name of Foodstuff	Hindi Name	Protein Content %	Biological value of Protein Content %	Fat %	Mineral Matter %	Carbohydrates%
19	Almond	Badam	20.8	...	58.9	2.9	10.5
20	Cashewnut	Kajoo	21.2	15.86	46.9	2.4	22.3
21	Cocoanut	Narial	4.5	2.61	41·6	1.0	13.0
22	Gingelly	Til	18.3	12.26	43.3	5.2	25.2
23	Groundnut	Mungfali	26.7	15.48	40.1	1.9	20.3
24	Groundnut roasted	Bhuni mungfali	31.5	...	39.8	2.3	19.3
25	Linseed	Alsi	20.3	...	37.1	2.4	28.8
26	Mustard seeds	Rai	22.0	...	39.7	4.2	23.8
27	Pistochio nut	Pista	19.8	...	53.5	2.8	16·2
28	Walnut	Akrot	15.6	...	64.5	1.8	11.0

Fats and oils of vegetable origin derived from oilseeds are in general devoid of carotene and

OTHER VEGETABLES—(*Contd.*)

Moisture %	Calcium %	Phosphorus %	Iron units	Calories per 100 gms.	Carotene Units per 100 gms.	Vitamin B 1 Units per 100 gms,	Vitamin B 2	Vitamin C units per 100 gms.	No.
93.1	.04	.03	1.4	20	260	...	...	28	1
92.1	.02	.04	.4	30	36	85	...	...	2
88.0	.09	.08	1.5	41	58	21	+	16	3
78.9	.05	.07	2.3	77	30	75	...	11	4
90.0	.01	.02	4.5	39	150	...	...	3	5
„	.05	.02	1.2	59	...	...	...	600	6
92.3	.03	.04	1.7	18	...	...	...	...	7
72.1	.02	.08	1.5	109	139	120	...	9	8
88.5	.04	.04	1.2	36	...	...	...	28	9
90.2	.03	.05	.1	28	...	...	...	...	10
83.2	.01	.03	.6	66	50	15	++	24	11
92.6	.01	.03	.7	28	84	200	...	2	12
95.4	.04	.04	1.6	18	56	22	...	...	13
70.0	.02	.15	.8	117	20	...	...	...	14
94.1	.05	.02	1.3	22	160	...	...	Trace	15
92.8	.02	.04	2.4	27	320	23	...	31	16
91.1	.03	.04	.4	34	Trace	40	...	43	17
94.8	.01	.03	0.6	20	Trace	...	...	18	18

NUTS AND OILSEEDS

Moisture %	Calcium %	Phosphorus %	Iron units	Calories per 100 gms.	Carotene Units per 100 gms.	Vitamin B 1 Units per 100 gms,	Vitamin B 2	Vitamin C units per 100 gms.	No.
5.2	.23	.49	3.5	655	Trace	30	...	0	19
5.9	.05	.45	5.0	596	100	...	+	0	20
36.3	.01	.24	1.7	444	Trace	15	Poor	1	21
5.1	1.44	.57	10.5	564	100	...	...	0	22
7.9	.05	.39	1.6	549	63	300	+	0	23
4.0	.05	.44	.3	561	...	...	...	...	24
6.6	.17	.37	2.7	530	50	...	...	0	25
8.5	.49	.7	17.9	541	270	...	...	Trace	26
5.6	.14	.43	13.7	626	240	...	...	0	27
4.5	.10	.38	4.8	687	10	150	...	0	28

Vitamin A. Red palm oil is an exception.

CONDIMENTS, SPICES, ETC.

No.	Name of Foodstuff	Hindi Name	Protein Content %	Biological value of Protein Content %	Fat %	Mineral Matter %	Carbohydrates%
1	Asafoetida	Hing	4.0	...	1.1	7.0	67.8
2	Cardamom	Aelaychi	10 2	...	2.2	5,4	42.1
3	Chillies green	Hara mirch	2.9	...	.6	1 0	6.1
4	Chillies dry	Lal mirch	15.9	...	6·2	6.1	31.6
5	Cloves	Loung	5.2	...	8.9	5,2	47.9
6	Coriander	Dhania	14.1	...	16,1	4.4	21.6
7	Cumin	Zira	18.7	...	15.0	5.8	36.6
8	Fenugreek seeds	Metni	26.2	...	5.8	3.0	44.1
9	Garlic	Lehsun	6.3	...	.1	1.0	29.0
10	Ginger	Adrak	2.3	...	.9	1.2	12.3
11	"Kandanthippli"	Lendi Pepal	6.4	...	2.3	4.8	65.8
12	Lime-peel	नीबूका छिलका	1.8	...	.5	1.8	29.4
13	Mace	Javitri	6.5	...	24.4	1.6	47.8
14	Nutmeg	Jaiphal	7.5	...	36.4	1,7	28.5
15	Omum	Ajvan	15.4	...	18.1	7.1	38.6
16	Pepper (green)	Kali mirch	4.8	...	2.7	1,8	27.3
17	Pepper (dry)	,, (sukha)	11.5	...	6.8	4.4	49.5
18	Tamarind pulp	Imli	3.1	...	.1	2.9	67.4
19	Turmeric	Haldi	6.3	...	5.1	3,5	69.4

FRUITS

No.	Name of Foodstuff	Hindi Name	Protein Content %	Biological value of Protein Content %	Fat %	Mineral Matter %	Carbohydrates%
20	Apple	Seb	0.3	...	.1	.3	13.4
21	Banana	Kela	1.3	...	.2	.7	36.4
22	Bilimbi	Kamrak	.5	...	.2	.2	4.8
23	Cape goose berry	Rasbary	1.8	...	.2	.6	11.5
24	Cashew fruit	Kaju ka phal	.2	...	.1	.2	11.6
25	Dates (Persian)	Khajur	3.0	...	.2	1.3	67.3
26	Figs	Anjeer	1.3	...	.2	.6	17.1
27	Grapes blue variety	Angur	.8	...	.1	.4	10.2
28	Grape fruit (Marsh's seedless)	,, (Bedana)	1.0	...	.1	.4	10.
29	Guava, country	Amrud	1,5	...	.2	.8	14.5
30	Jack fruit	Kathal	1 9	...	.1	.8	18.9
31	Jambu fruit	Jamun	.7	...	.1	.4	19·7

CONDIMENTS, SPICES, ETC.

Moisture %	Calcium %	Phosphorus %	Iron units	Calories per 100 gms.	Carotene Units per 100 gms.	Vitamin B 1 Units per 100 gms.	Vitamin B 2	Vitamin C, units per 100 gms.	No.
16.0	.69	.05	22.2	297	...	...	...	0	1
20.0	.13	.16	5.0	229	...	...	...	0	2
82.6	.03	.08	1.2	41	454	...	...	111	3
10.0	.16	.37	2.3	246	576	...	...	50	4
23.3	.74	.10	4.9	293	...	...	...	0	5
11.2	.63	.37	17.9	288	1570	...	...	Trace	6
11.9	1.08	.49	31.0	356	870	...	...	3	7
13.7	.16	.37	14.1	333	160	...	...	0	8
62.8	.03	.31	1.3	142	0	...	...	13	9
80.9	.02	.06	2.6	67	67	...	...	6	10
12.2	1.23	.19	62.1	310	...	...	...	0	11
66.5	.71	.06	2.7	129	...	...	...	...	12
15.9	.18	.10	12.6	437	...	...	...	0	13
14.3	.12	.24	4.6	472	Trace	...	...	0	14
8.9	1.42	.30	14.6	379	...	...	...	...	15
63.4	.27	.07	2.4	153	680	...	...	...	16
12.9	.46	.20	16.8	305	...	...	...	...	17
20.9	.17	.11	10.9	283	100	...	...	3	18
13.1	.15	.28	18.6	349	50	...	...	0	19

FRUITS

Moisture %	Calcium %	Phosphorus %	Iron units	Calories per 100 gms.	Carotene Units per 100 gms.	Vitamin B 1 Units per 100 gms.	Vitamin B 2	Vitamin C, units per 100 gms.	No.
85.9	.01	.02	1.7	56	Trace	40	...	2	20
61.4	.01	.05	0.4	153	...	Trace	50	1	21
93.9	.01	.01	.6	23	240	...	...	...	22
82.7	.01	.06	1.8	55	...	...	...	49	23
87.9	.01	.01	0.2	48	...	...	...	...	24
26.1	.07	.08	10.6	283	600	30	+	Trace	25
80.8	.06	.03	1.2	75	270	...	...	2	26
85.5	.03	.02	.4	45	15	Trace	...	3	27
88.5	.03	.03	.2	45	...	40	...		28
76.1	.01	.04	1.0	66	Trace	...	...	299	29
77.2	.02	.03	.5	84	540	...	...	10	30
78.2	.02	.01	1.0	83	...	...	...	...	31

FRUITS—(*Contd.*)

No.	Name of Foodstuff	Hindi Name	Protein Content %	Biological value of Protein Content %	Fat %	Mineral Matter %	Carbohydrate %
1	Karwand dry	Karwand	2,3	...	9.6	2.8	67.1
2	Korukka falli	Chich Bilayi	2.6	...	.3	.4	15.9
3	Lemon	Meetha neembu	1.0	...	.9	.3	11.8
4	Lime	Neembu	1.5	...	1.0	.7	10.9
5	Mango (ripe)	Am	.6	...	.1	.3	11.1
6	Melon, water	Tarbuz	.1	...	.2	.2	3.8
7	Orange	Santra	.9	...	.3	.4	10.6
8	Palmyra fruit (Tender)	Tadgol	.6	...	.1	0.2	6,5
9	Papaya, ripe	Papita	.5	...	.1	.4	9.5
10	Peaches	Arhu	1.5	...	.2	.6	7.6
11	Pears	Naspati	.2	...	.1	.3	11.5
12	Pine apple	Ananas	.6	...	.1	5	12.2
13	Plantain (red variety)	Lal kela	1.6	...	.1	.8	23.4
14	Plums (red variety)	Jardalu	.7	...	.2	.4	8.9
15	Pomegranate	Anar	1.6	...	.1	.7	14.6
16	Pomeloe	Chakutra	.6	...	.1	.5	10.2
17	Raisins	Khismis	2.0	...	.2	2.0	77.3
18	Straw berry	Staberry	.7	...	.2	.4	9.8
19	Tomato, ripe	Tamata	1.0	...	.1	.5	3.9
20	Wood apple	Kaith	7.3	...	.6	1.9	15.5
21	Zizyphus	Ber	.8	...	.1	.4	12.8
22	Seethaphal	Sharifa	1.6	...	.3	.7	23.9
		FLESH FOODS					
23	Beef	Gai ka gosht	22.6	22.0	2.6	1.0	...
24	Egg, duck	Batakh ka anda	13.5	12.7	13.7	1.0	.7
25	Egg, fowl	Murgi ka anda	13.3	...	13.3	1.0	...
26	Fish	Machli	22.6	...	.6	.8	...
27	Sheep liver	Kaleji (Bher)	19.3	...	7.5	1.5	1.4
28	Mutton	Bakri ka gosht	18.5	...	13.3	1.3	...
29	Mutton fat	Bher ki Charbi	.34	...	26.4	...	...
30	Pork	Suar ka gosht	18.7	...	4.4	1.0	...
		MILK AND MILK PRODUCTS					
31	Milk, cow's	Gai ka dudh	3.3	2.7	3.6	.7	4.8
32	Milk, buffalo's	Bhains ka dudh	4.3	3.6	8.8	.8	5.1
33	Milk, goat's	Bakri ka dudh	3.7	3.1	5.6	.8	4.7

FRUITS—(*Contd.*)

Moisture %	Calcium %	Phosphorus %	Iron units	Calories per 100 gms.	Carotene Units per 100 gms.	Vitamin B 1 Units per 100 gms.	Vitamin B 2	Vitamin C units per 100 gms.	No.
18.2	.16	.06	39.1	364	...	...	...	...	1
80.8	.01	.04	.4	77	...	...	...	...	2
85.0	.07	.01	2.3	57	Trace	...	...	Juice 39	3
84.6	.09	0.2	.3	59	26	...	...	Juice 63	4
86.1	.01	.02	.3	50	4,800	...	Poor	13	5
95.7	.01	.01	.2	17	Trace	...	...	1	6
87.8	.05	.02	.1	49	350	40	...	68	7
92.7	.01	.02	.5	28	...	...	...	4	8
89.6	.01	.01	.4	40	2,020	...	...	46	9
90.1	.01	.02	1.7	38	Trace	...	...	1	10
86.9	.01	.01	.7	47	14	...	...	Trace	11
86.5	.02	.01	.9	50	60	...	...	63	12
74.1	.01	.02	.6	101	350	...	...	...	13
89.8	.02	.02	.5	40	230	40	...	1	14
78.0	.01	.07	.3	65	0	...	...	16	15
88.0	.03	.03	.1	44	200	...	...	20	16
18.5	.10	.08	4.0	319	0	75	...	Trace	17
87.8	.03	.03	1.8	44	...	...	...	52	18
94.5	.01	.02	.1	21	320	40	...	32	19
69.5	.13	0.11	.6	97	...	...	...	...	20
85.9	.03	.030	.8	55	70	...	...	...	21
73 5	.02	.04	1.0	105	...	...	...	...	22
FLESH FOOD									
					Vit. A	Carotene			
73.4	.01	.19	.8	114	59	Trace 50	...	2	23
71.0	,07	.26	3.0	180	1200	900 ...	...	...	24
73.7	.06	.22	2.1	173	1200	1000 ...	...	...	25
78.4	.02	.19	.9	91	26	9 ...	...	...	26
70.4	.01	.38	6.3	150	22,300	0 120	...	20	27
	.15	.15	2.5	194	31	Trace 60	...	..	28
...	...	...	....	900	...	...	...	...	29
77.4	.03	.2	2.3	114	Trace	Trace 180	...	2	30
MILK AND MILK PRODUCTS									
87.6	.12	.09	.2	65	180	Trace 17	++	2	31
81.0	.21	.13	.2	117	162	Trace ...	...	...	32
85.2	.17	.12	.3	84	182	Trace ...	...	...	33

MILK AND MILK PRODUCTS—(*Contd.*)

No.	Name of Foodstuff	Hindi Name	Protein Content %	Biological value of Protein Content %	Fat %	Mineral Matter %	Carbohydrates%
1	Milk, human	Aurat ka dudh	1.0	...	3.9	.1	.7
2	Curds	Dahi	2,9	...	2.90	.6	3.3
3	Butter	Makhkhan	...	...	80.8	...	...
4	Ghee, cow's	Gai ka ghee	...	...	98.0	...	...
5	Ghee, buffalo's	Bhains ka ghee	...	...	98 0	...	...
6	Butter milk	Chhachh	.8	...	1.1	.1	.5
7	Skimmed milk	...	2.5	...	.1	.7	4.7
8	Skimmed milk powdered	...	38.0	...	.1	6.8	51.0
9	Cheese	Panir	24.1	...	25.1	4.2	6.3
10	Koa (whole buffalo (milk)	Koa	14.6	...	31,2	3.1	20.5
11	Koa (skimmed buffalo milk)		22.3	...	1.6	4·3	25.7

SUGARS AND STARCHES*

No.	Name of Foodstuff	Hindi Name	Protein Content %	Biological value of Protein Content %	Fat %	Mineral Matter %	Carbohydrates%
12	Cane sugar, refined	Chini	...	...	...	,02	...
13	Cane gur	Ganne ka gur	.35	...	.17	.74	90.6
14	Coconut palm gur	Nariel ka gur	.96	...	.15	5,04	83.53
15	Date palm gur	Khajur ka gur	1.46	...	.26	2.6	86.7
16	Palmyra palm gur	Tad ka gur	1·3	...	,08	1.81	88.47
17	Sago palm gur	Madi ka gur	2,28	...	.11	3.66	84.89
18	Coconut sweet toddy	Nariel ka nira	.10	...	.10	.66	14.35
19	Palmyra sweet toddy	Tad ka nira	.23	...	.02	.29	13.52

MISCELLANEOUS FOOD STUFFS

No.	Name of Foodstuff	Hindi Name	Protein Content %	Biological value of Protein Content %	Fat %	Mineral Matter %	Carbohydrates%
20	Arrow root	Arrow root	.2	...	.1	.1	83.1
21	Betel leaves	Pan	3.1	...	.8	2.3	6.1
22	Cod liver oil		...	...	100	...	...
23	Halibut liver oil		...	...	100	...	...
24	Red palm oil		...	...	100	...	...

Note:—(1) Items 2 and 7 from Nutrition Research Laborataries, Coonoor, (2) All other items

MILK AND MILK PRODUCTS—(*Contd.*)

Moisture %	Calcium %	Phosphorus %	Iron units	Calories per 100 gms.	Vitamin A Units per 100 gms.	Carotene	Vitamin B 1 Units per 100 gms.	Vitamin B2	Vitamin C units per 100 gms.	No.
88.0	.02	.01	.2	67	208	Trace	...	...	0	1
90.3	.12	.09	.3	51	130	Trace	...	...	...	2
...				730	600 to 6,000		...	+	Vit. D	3
...				900	1,000to2,500		...	+		4
...				900	500			+		5
97.5	.03	.03	.8	15	Trace		0	...	...	6
92.1	.12	.09	.2	29	...	...	...	...	1	7
4.1	1.37	1.0	1.4	357	0	...	19	...	...	8
40.3	.79	.52	2.1	348	273	...	...	...	...	9
30.6	.65	.42	5.8	421	...	...	...	...	...	10
46.1	.99	.65	2.7	206	...		...	...	0	11

SUGARS AND STARCHES

Moisture %	Calcium %	Phosphorus %	Iron units	Calories per 100 gms.	Total sugar present as: Cane sugar	Glucose and fructose	No.
.04				...	99.7	Nil	12
8.1	.064	.056	2.5	365.3	...	...	13
10.3	1.638	.062	...	...	71.89	3,70	14
9.2	.363	.062	...	...	72.01	1,48	15
8.6	.225	.044	...	...	79.92	1,98	16
9.2	1.352	.372	...	...	84.31	,53	17
84.7	.149	.011	.26	59.33	...		18
85.9	.006	.007	...	56.6	...		19

MISCELLANEOUS FOOD STUFFS

Moisture %	Calcium %	Phosphorus %	Iron units	Calories per 100 gms.	Vitamin A Units per 100 gms.	Carotene	Vitamin B 1 Units per 100 gms.	Vitamin B2	Vitamin C units per 100 gms.	No.
16.5	.01	.02	1.0	334	...		...	...	...	20
85.4	.23	0.4	5.7	44			9600	...	5	21
...	...	...	...	900	60,000to200,000					22
...	...	...	...	900	39,00000					23
...	...	...	...	900	40,000to50,000					24

from Public Health Laboratarics, Patna,

FOOD FACTORS AT A GLANCE

No.	*Food factor*	*Special Action*
1.	Protein	Supplies building material for the body and making good the loss of tissue.
2.	Fat	Supplies reserve energy. Helps the digestion of carbohydrates. Provides proper paddings in different parts of the body. Prevents the loss of heat from the body
3.	Carbohydrates	Body's chief source of energy
4.	Calcium	Necessary for the growth of bones and teeth. Makes the heart work properly and the blood to clot so that too much does not go out in case of wound. Helps the body to use properly other constituents of food such as fats and iron
5.	Phosphorus	Necessary for all living tissues and is an important constituent of blood.
6.	Iron	Necessary for blood formation. Enables blood to carry oxygen from lungs to every part of the body. For lack of sufficient iron in the food, people suffer from general weakness, anaemia.

FOOD FACTORS AT A GLANCE

Distribution in nature	*Remarks*
Animal foods: milk, eggs, fish and meat	Growing children and expectant and nursing mothers require more protein.
Animal fats, vegetable oils and food stuffs, such as coconuts, nuts, soya bean, avocado pear	Animal fats contain Vitamin A and D while most vegetable oils lack this factor. Only one vegetable oil, red palm oil, is rich in Vitamin A activity.
Grain foods, root vegetable and sugar	Carbohydrates are generally present in an excessive proportion in Indian diet.
The best source is milk (including skimmed milk and butter milk). Green leafy vegetables and certain of the millets *e. g.* ragi	Calcium of green vegetables and millets may not be as well absorbed and assimilated as the calcium of milk. Insufficiency of calcium is one of the most important defects of the rice eaters' diet. Children need more calcium and expectant and nursing mothers require a large intake of it.
Cereals in raw state	Considerable loss of this element occurs during the washing and cooking of rice. Diet containing sufficient calcium ensures sufficiency of phosphorus.
Cereals, pulses, nuts and oil seeds, meat and leafy vegetables	A fairly high percentage of iron in cereal, pulses and meat but a lower percentage of iron in vegetables is assimilated. Pregnant women require more iron.

VITAMINS—THEIR PROPERTIES AND WHERE FOUND

The following is taken mainly from "A survey of present knowledge", 1932—Medical Research Council, Britain, reproduced in pamphlet No. 6 of the Bombay Presidency Baby and Health Week Association, B. D. D. Chawl, 10, Delisle Road, Bombay No. 11. Slight changes have been made by us to make technical terms intelligible to the lay reader.

Specially noteworthy points are indicated by heavy type.

Vitamin	*Special action*	*Ill effects of the deficiency of the Vitamin*	*Properties*	*Distribution in nature*
A 1	**Anti-infective :** Local defence of the mucus membranes of :—	1. Produced Keratinization (or forming a horny matter of the upper layer of the skin.)	1. Fat soluble	**Liver of sheep** Milk, fish meal, fish oils
	(a) Intestines	2. A factor in the causation of anæmia	2. Destroyed by æration at all temperatures but not by closed heating upto 120°C for half an hour.	Butter Outer leaves of lettuce and cabbage, spinach, yellow carrots, tomato, bananas, **papaya, mango** Outer portion of orange peel, **green tops of bamboo, radish and turnips** **(Green spinach and green cabbage are weight for weight as good as best butter in their richness in Vitamin A.)**
	(b) Eyes	3. Xerophthalmia (drying of the eyes)		
	(c) Respiratory passage	4. Night blindness		
	(d) Genito-urinary passage	**5. Susceptibility to infection**	3. Destroyed by exposure to light	

Vitamin	Special action	Ill effects of the deficiency of the Vitamin	Properties	Distribution in nature
	2. Protects central nervous system **3. Promotes growth**		Relation of Carotene to Vitamin A Carotene is found in plants (orange red colour). The same is stored in animals as Vitamin A (colourless)	:-Grams (germinated) Yellow maize
* B_1.	Necessary for growth and maintenance	1. Polynueritis: (inflammation of many nerves at a time)	1. Water soluble	It is found in yeast, whole grains and cereals, cabbage, lettuce, potatoes, carrots.
	Antineuritic	2. Beri-Beri	2. Stable at 100° C for half an hour (baking of bread and biscuits does not destroy it).	Yolk of egg, meat, brain of sheep
		3. Loss of appetite	3. It is found in preserved and canned food.	Relative potency taking that of wheat germ as = 100; **Rice germ** = 200
		4. A factor in the causation of anaemia.	4. Alkalies (Baking powders) destroy it readily.	Lentils = 80; Yeast = 60
		5. General tissue atrophy: less secretion of milk.	5. Desiccation or exposure to air does not destroy it.	Peas = 40

* Note:—It keeps the brain, the nerves, the heart, the liver, the digestive glands and the kidneys healthy and strong. It enables the muscles of the body, including those of the bowels, to remain in a fit condition. It maintains the appetite and aids digestion. When food contains plenty of Vitamin B_1, it is not only eaten with relish but digested well and waste materials are discarded properly from the body. If any vitamin can be said to be more important for health and well being than any other, it is Vitamin B_1.

Vitamin	Special action	Ill effects of the deficiency of the Vitamin	Properties	Distribution in nature
B_2	**Antidermatitic**	1 Pellagra : (deficiency diseases of the skin)	1. Water soluble	Practically the same as B_1
			2. More stable to heat than B_1	It is also present in yeast, spinach, peas, water cress, fruit
			Other proporties same as B_1	Liver, fresh cow's milk, white of egg
C	**Antiscorbutic**	1. Scurvy (spongy and bleeding gums etc.) 2. General atrophy of tissues 3. Osteoporosis(softening in bones and teeth)	1. Water soluble 2. It is **produced during germination of seeds.**	All green salad foods
			Is found in living plant tissues where active metabolic processes are still proceeding (green leaves and fruits).	Lemon juice, orange juice, tomato, papaya cabbage Amla or nellikai is probably the richest natural source of Vitamin C. A single fruit is equivalent in Vitamin C to one or two oranges.
			3. Very sensitive to oxidizing agents	Mung, Peas, Lentils } germinated
			4. destroyed by alkaline medium in the presence of air (baking powder)	Raw milk
			5. Heating to 80 °C or 6. Drying in the sun destroys it.	Meat

Vitamin	Special action	Ill effects of the deficiency of the Vitamin	Properties	Distribution in nature
D	**Calcifying Vitamin** 1. Helps to assimilate calcium and phosphorus and thus to strengthen bones and teeth.	1. Rickets, 2. Osteomalacia: (rickets of grown ups). 3. Defective teething. 4. Infantile Tetany (fits). 5. Tendency to Hæmorrhage (bleeding).	1. Fat soluble 2. It gives best results when a tolerably good supply of minerals is available in foods and less starchy foods are given.	Cod liver oil, shark liver oil, butter, eggs, leafy vegetables, Tomatoes, yellow carrots, milk, germ of wheat and maize
	2. Prevents diseases due to deficiency of calcium.		3. It is required more during periods of strain such as growth, pregnancy and lactation. 4. Crystalline Vitamin D (Calciferol) is very stable.	**Sun-shine**
E	Necessary for the synthesis of the Anterior Pituitary Harmone	1. One cause of sterility in males and females 2. Tendency to miscarriages	1. Fat soluble 2. Very stable under ordinary condition	Wheat germ oil, green leaves and embryos of seeds, carrots, cauliflower, lettuce, cucumber, green pepper, raw potatoes, spinnach, green peas, turnips, bananas, milk, butter

SOME INDIGENOUS INVALID FOODS

A NOTE By DR. A. LAKSHMI PATHI

Managing Director,

ANDHRA AYURVEDIC PHARMACY

MADRAS

1. Butter-milk

First and foremost is butter-milk. This is made sweet or sour, thick or thin by churning curd and adding 4 times the quantity of water. Butter may or may not be removed. It is used according to the digestive capacity of the patient. This gives the required nutrition and is easily digestible. This may be taken even by healthy persons in place of tea. This may be taken while travelling as there is no fear of its contamination. If it is a bit sour, it is all the better because it has more germicidal properties. The taste may be improved by adding salt and a few drops of lemon juice. This form of food is available throughout India and in all seasons.

It may be seasoned with salt, turmeric, asafoetida, lasun or sugar according to the cooling and heating property required.

I give butter-milk in all cases of typhoid fever judging only the need for some nutrition. Curds devoid of fats are used in certain diseases. This food should be used according to the degree of appetite.

2. Milk and Barley Water

Cow's milk diluted with 3 or 4 parts of barley water is also given. It is better than milk given alone. Buffalo milk is not so good, but if cow's milk is not available the dilution is increased. Milk mixed with decoction of Dhaniya (Coriander), pepper, etc. is even more easily digestible.

3. Whey

I sometimes use *whey* prepared by straining through cloth milk addled by adding a few drops of lemon juice to boiling milk.

4. Human Milk

Human milk is a very good food for invalids. It gives strength and man being accustomed to it from infancy, it is most suitable even in a weak state of digestion for all individuals. It is not so difficult to secure as it may at first be imagined. Ideas of humanity prevail in Indian mothers,

who are prone to help an ailing person or an infant. Poor people part with it for a little money or food in return.

5. **Goat's milk**

Goat's milk is even better than cow's milk for patients. It is simply strained through one or two layers of cloth in order to remove any stray hair and heated to boil and diluted with equal parts of water. If digestion is good the milk may be given without adding water. In children. suffering from digestive disorders, with definite liver disease, goat's milk has often effected a radical change. '*Charaka*' specially recommends goat's milk to children and consumptives.

6. **Malted Ragi Flour**

Ragi is cleaned and soaked for 24 hours with intermittent changes of water and aerations at least 6 times. The water is strained and the seeds are allowed to sprout under a wet cloth. They are fried after drying and powdered. The powder gives a taste like that of cocoa when mixed with milk and sugar or jaggery.

7. **Laja Flour**

Paddy is fried in a pot so as to make the seeds burst into flowers. The well flowered seeds are powdered and kept covered in a bottle ready for use. A tea-spoonful of flour is boiled with water into a conjee and is given to the patients with fever or diarrhoea. The seeds of cholam may also be fried in this manner so as to burst into flowers and powdered, or the flowers may be boiled with water and strained. This is very light as a diet.

8. **Fried Rice**

Rice is fried carefully so as to get a brown colour. This converts a portion of the starch into dextrin. The dextrinised rice is broken into 2 or 3 pieces by grinding it gently in grinding stone. The rough grains are taken out by sieving and preserved in a covered tin.

This is boiled with water as ordinary rice and given to the patient along with cooked vegetables, pepper water or butter-milk. This is liked by the patients very much. It is sweeter than ordinary rice and is also very easily digested. It is much used in gastric irritation and ulcers. This cooked dextrinised rice may be given with milk and sugar in desired proportions.

9. **Papads**

Papads or perpata made of black gram mixed with asafoetida, turmeric, saindhava salt, jeera, sajjikhar (soda-bicarb) may be fried on fire and taken

They are tasty. They improve the appetite but are a little heavy. But papads prepared from green gram are lighter to digest.

10. Vadams

Vadams or vatikas are of pieces of vegetables such as Koosmanda mixed with black gram or green gram paste and made into balls, dried in the sun so as to be very crisp. Vadams are light and good appetisers, They are fried in ghee or oil before use.

11. Fruit Juice

The juice of fruits such as oranges, tomatoes and grapes is given to invalids and children mixed with sugar or jaggery but it is better to dilute the fruit juice with 3 or 4 times the quantity of water. The dried fruits, such as dates and raisins (draksha) mixed with 4 times the quantity of water, may also be used.

12. Glucose

The above grape juice is the same thing as glucose dissolved in water. Glucose is an artificially made grape sugar prepared from any carbohydrate. Even sawdust is used for the purpose. Glucose is prepared in Sevagram Ashram by adding lemon juice to a solution of cane sugar and boiling it till it is reduced to glucose.

13. A compound fruit liquor

Soak in a glass or earthen vessel bits of required quantity of dried angur, dried grapes, khajur and apple chips in equal parts, say, half a tola each. Add a tumbler of water along with half a lemon fruit, cut and put into the mixture along with the skin. Keep it overnight or for an hour. Squeeze, filter and take the juice with half an ounce of honey or a tea-spoonful of sugar. This fruit liquor taken early in the morning is nutritive as well as laxative.

14. Honey

Honey is transformed glucose in solution. As it is derived from many flowers with different medicinal properties, it is very much recommended in Ayurveda. But, taken in excess, it is believed to be heating. It is also believed to reduce fat in stout people.

15 Amalaki

Amla or Indian gooseberry has been found to contain in a dry state, Vitamin C in large quantities and is supposed to be the best for the supply fo this Vitamin in tablet form. It is now supplied for military needs in bulk.

MALTS

A suggestion for improving the quality of our food, though not very effective yet good in its way, is to malt the grains. The process involved is simple. The grains are soaked in water for 12 to 24 hours, the water is strained and the wet seeds are allowed to germinate or sprout for a day or two under a wet cloth. After a little drying the sprouted grains are ready for use in the raw or cooked form or after being powdered.

During the process of germination striking changes take place in the food substances of the grains. The starch is converted into dextrines and maltose and the proteins into peptones and amino acids, substances which are readily digested and, therefore, fit for infant and invalid consumption. The sprouts contain Vitamin C to the extent of 15 units per 100 gms. according to Dr. Akroyd, and also some Vitamin A, according to Sir Robert McCarrison, both of which are not present in the grains in their ordinary form.

Nutrition experts have spoken of malts mostly in connection with cereals. This is purely from the point of view of invalid food. In India, cereals are not much utilized for being malted and this can be done with profit. This will solve the difficulty of those who depend on foreign malted foods, the imports of which amounted to about Rs. 77,00,000 per annum, till the present war, according to Agricultural Chemist to the Government of Madras. Practically all the common cereals such as wheat, barley, maize, juar, bajra, rice (in the form of paddy) and ragi can be malted and substituted for the imported malted foods.

But in as much as the protein contents, and not only the starch of the grains are converted into their easily digestible forms during the process of germination, pulses which are rich in proteins, can also be utilized as malted food. In fact, pulses such as gram, mug, moth, etc. are being malted in India for centuries past. Cereals like bajra are also occasionally used for the purpose. The malted grains are called बरडां in Gujarat, बिरडया or उसळ in Maharashtra, अंकुरित छोला आदि in Bihar and Bengal, फूले हुए छोले आदि in Hindi provinces and 'Molakalu' in Andhra.

So, the process is nothing new to our people and no elaborate instructions are required for its teaching. What requires to be done is to get the practice, which is restricted to certain occasions or to certain communities like the Jains who use it more often than others, extended for all communities and for every day use. In the Punjab and in Sind, pulses are only soaked in water and used. They can be persuaded to allow the process to take its full course.

As Sir Robert McCarrison puts it, sprouting of grains is a very good way to obtain Vitamin C when green vegetables and fruits are scarce. As this vitamin is most sensitive to heat, however, he suggests that the sprouted grains should be eaten raw or after cooking for a very short time.

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